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*Columbia National Forest
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MOSQUITO SURVEY AND CONTROL

TWIN BUTTES, WASHINGTON

COLUMBIA NATIONAL FOREST

by

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Direction

of

U.S. Department of Agriculture,
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*Approved 10/2/35
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Vancouver, Washington.
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INTRODUCTION

Because of heavy snows and late season, mosquito control was not started in the Twin Buttes section until June 17. It is particularly unfortunate that the work was not started a month earlier, since on June 17, when our first inspections were made, mosquito breeding was observed over the whole district. The district is exceedingly large and the areas needing treatment are so scattered that with the funds available all areas could not be thoroughly treated before some of the adults were on the wing.

Six Barrels of oil were stored near the Mosquito Lakes Guard Station in September, 1934, for 1935 control work. This was of great assistance since packing such large quantities of oil in by pack-train before the roads are cleared is an arduous and expensive task.

The work described was done by four CCC laborers and the writer. In addition to this force a cook was also assigned for a period of several weeks.

SEASONAL ABUNDANCE.

Since the abundance of the mosquito pest in mountain areas is in direct proportion to the amount of snowfall, a great deal more breeding was observed this year than in 1934. Additional areas were discovered, as well as an increased number of pot holes, swales, and temporary accumulations of snow-water. The larvae, then, were more numerous only because there were more suitable breeding situations and it is definitely known that eggs laid during one season may remain fertile for several years if not covered by water in the meantime.

SUMMARY OF AREAS TREATED - 1934, 1935.

April 20 - July 1, 1934.

June 17 - July 22, 1935.

<u>Area No.</u>	<u>Acres</u>	<u>Gals. Oil</u>	<u>Date Treated</u>	<u>Area No.</u>	<u>Acres</u>	<u>Gals. Oil</u>	<u>Date Treated</u>
1 A	1	20	4/28				
1 E	1	20	5/14				
2 C	15	302	4/20,21,22 5/2,10	2 C	10.25	241	6/17,19,22
2 D	.75	15	4/24,26	2 D	.50	12	6/26
2 E	.12 $\frac{1}{2}$	3	5/17	2 E	3.	47	6/27,28-7/7
2 F	.25	5	5/19	2 F	1.25	30	6/26
2 H	.25	4	5/30				
3	.75	13	5/1				
3 A	1.5	30	4/23				
3 B	.75	16	4/22				
3 C	1.75	34	5/1, 3	3 C	.25	7	6/25
3 D	5.25	105	5/24,25	3 D	7.	187	6/21,22-7/6,12
				3 F	2.	32	7/4
4 A	4	80	4/26,27	4 A	2.50	50	6/18 - 7/2
				4 B	.25	4	7/2
5 B	3	60	5/9,10				
6	.25	4	4/24				
				6 A	.25	3	6/12
				6 B	.50	6	6/15
6 D	.12 $\frac{1}{2}$	1	4/24	6 D	1.	20	6/20
				6 G	.25	2	6/19
				6 H	.75	10	6/19
				6 F	.50	10	6/20
				6 L	.50	10	6/19
7	3.	58	4/25,26				
7 A	.25	7	4/24	7 A	.50	10	6/27
7 B	.25	4 $\frac{1}{2}$	5/3	7 B	.25	8	6/24
				7 C	1.	24	6/24
				7 D	.25	8	6/24
7 F	2.	37	5/7,10	7 F	1.50	30	6/24
				7 G	.25	8	6/25
				7 H	1.	24	6/25
				7 K	.25	8	6/25
				7 M	.50	16	6/25
				7 N	3.	60	6/24 - 7/2
				7 P	1.	36	6/20
				7 Q	1.	15	6/20
8	.12 $\frac{1}{2}$	1	5/3				
8 E	.12 $\frac{1}{2}$	1	5/3	8 F	.25	2	6/22
				8 G	.25	3	6/22
				8 H	.25	2	6/22
				8 L	.25	5	6/22
8 N	.12 $\frac{1}{2}$	2 $\frac{1}{2}$	5/3	8 Q	.25	1	6/22
				8 U	.25	7	6/22

Summary of Areas Treated - 1934, 1935.
(Con. -2-)

<u>Area No.</u>	<u>Acres</u>	<u>Gals. Oil</u>	<u>Date Treated</u>	<u>Area No.</u>	<u>Acres</u>	<u>Gals.Oil</u>	<u>Date Treated</u>
9 A	1	21	5/7	9 A	n .50	16	6/22
9 B	.12 $\frac{1}{2}$	1	5/7				
9 C	.12 $\frac{1}{2}$	1	5/7				
9 D	.25	5	5/7	9 D	.25	3	7/11
9 E	.12 $\frac{1}{2}$	2	5/8	9 E	.50	9	6/19, 27
9 G	.12 $\frac{1}{2}$	2	5/8	9 G	.50	10	6/27
9 I	.25	4	5/8	9 I	.25	8	6/19
				9 H	.25	5	6/19
				9 S	.25	3	7/11
				9 W	.25	3	7/11
				9 Y	.50	8	7/11
				9 Z 5	.25	6	7/9
				9 Z 6	.25	6	7/9
				11 A	1.	36	6/21

SUMMARY OF TREATMENT FOR EACH AREA - 1935

Area No.	Gallons of Oil	Acres of Water Sur- face Treated	Acres of Water Sur- face not Treated	Reason for Not Oiling	Approximate date Oiling should have been done
1			3	Work begun too late	May 25th
2	330	17.75	0.5	Discovered area too late	June 5th
3	194	8.75	3	Work begun too late	May 20th
4	54	2.75	2	" " " "	June 8th
5			5	" " " "	May 25th
6	61	3.75	0		June 15th
7	247	10.75	0		June 20th
8	20	1	2	Work begun too late	June 10th
9	44	2.25	5	Lack of time	June 1st
10			6	Work begun too late	May 20th
11	36	1.50	2	" " " "	June 10th
12			2	" " " "	June 1st
13			3	Lack of time	May 25th
14			6	Work begun too late	May 25th
15			4	Lack of time	May 25th
TOTAL-	986	48.50	43.5		

NEW AREAS

During the season of 1935 several additional breeding areas were discovered. These are described below and should be considered supplemental to the description of areas on pages 4-8 of the 1934 report.

Mosquito Lakes

<u>Code</u>	<u>Condition of Water</u>	<u>Size</u>	<u>Depth</u>	<u>Breeding Conditions</u>
W T B 2 J	Temporary	100 x 50 ft.	3 feet	Moderate
W T B 2 K	"	150 x 100 "	3 "	"

C C C Meadow

W T B 3 E	Temporary	3 Acres	3 feet	Moderate
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Squaw Butte Meadows

W T B 4 D	Temporary	50 x 70 ft.	3 feet	Excellent
W T B 4 E	"	63 x 75	3 "	"
W T B 4 F	"	25 x 35	2 "	"
W T B 4 G	"	58 x 28	2½ "	"
W T B 4 H	"	90 x 80	3 "	"

Sheep Lakes

W T B 6 I	Temporary	90 x 85 ft.	3 feet	Excellent
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NEW AREAS (Con)

South Meadows

<u>Code</u>	<u>Condition of Water</u>	<u>Size</u>	<u>Depth</u>	<u>Breeding Conditions</u>
W T B 7 O	Temporary	4 Acres	2 feet	Excellent
W T B 7 P	"	250 x 150 ft	2 feet	"
W T B 7 Q	"	200 x 115 "	2 "	"

Surprise Lakes Area

W T B 8 V	Temporary	30 x 25 ft	2 feet	Excellent
W T B 8 W	"	40 x 50	2 $\frac{1}{2}$ "	"

Saw Tooth Mountain

W T B 9 Z 5	Temporary	40 x 45 ft	2 feet	Excellent
W T B 9 Z 6	"	35 x 45 "	1 "	"

DISCUSSION OF BREEDING CONDITIONS BY AREAS

1935

Suggestions are made for future treatment.

Steamboat Mountain (#1)

The large district east of Steamboat Mountain is included in this area. Eleven sub-areas have been located, eight of which are permanent lakes and three are temporary ponds. Adults emerge from this general area very early, probably late in May, hence no oiling was done here this season. The area as a whole does not produce large numbers of mosquitoes.

AREA NO. F.S.W.T.B	AMOUNT OF BREEDING	Suggested treatment
1 A	Moderate around edges	Raise lake level several feet
1 B	" " "	Oiling
1 C	None	None
1 D	Moderate around edges	Oiling
1 E	Abundant	Raise lake level several feet
1 F	Moderate	Oiling
1 G	"	"
1 H	None	None
1 I	Moderate	Oiling
1 J	Abundant	"
1 K	None	None

Discussion of Breeding Conditions by Areas (Con)

Mosquito Lakes (#2)

This area is probably the most prolific breeding ground in the Twin Buttes region. Two permanent lakes, one temporary pond and eight good-sized meadows are included. Three hundred and thirty gallons of oil were used and a good control established. Work was started on June 17th. Somewhat better work could have been done if operations had been initiated 15 days earlier.

<u>AREA NO.</u>	<u>AMOUNT OF BREEDING</u>	<u>SUGGESTED TREATMENT</u>
2 A	Moderate around shallow edges	Raise level of lake 4 feet
2 B	" " " "	Drainage
2 C	Abundant	"
2 D	Moderate	"
2 E	Abundant	"
2 F	"	"
2 G	Moderate	"
2 H	"	"
2 I	"	"
2 J	Abundant	"

DISCUSSION OF BREEDING CONDITIONS BY AREAS (Con)

C C C Camp (#3)

Four meadows are within this area, 3 of which were practically dry when oiling was started. A great deal of mosquito breeding was found throughout the entire group of meadows. 194 gallons of oil were used.

<u>AREA NO.</u>	<u>AMOUNT OF BREEDING</u>	<u>SUGGESTED TREATMENT</u>
3 A	Moderate	Drainage
3 B	"	"
3 C	"	"
3 D	"	"
3 E	"	"

Squaw Butte Meadows (#4)

This area consists of one permanent lake, four temporary ponds and two meadows. Mosquito breeding was heavy. The sub-area, 4 A, should have been oiled about 10 days before our arrival. Fifty-four gallons of oil were used.

<u>AREA NO.</u>	<u>AMOUNT OF BREEDING</u>	<u>SUGGESTED TREATMENT</u>
4 A	Moderate	Drainage
4 B	Moderate around edges	Raise level of lake 6 feet
4 C	Moderate	Drainage
4 D	Abundant	"
4 E	"	"
4 F	"	"
4 G	"	"

DISCUSSION OF BREEDING CONDITIONS BY AREAS (Voh)

Cayuse Meadows (#5)

Two small, temporary ponds, one bog lake and one large meadow constitute the area. The earliest breeding in the Twin Buttes region is to be found here. No oiling was attempted since all of the mosquitoes had emerged probably a matter of 20 days before our arrival.

<u>AREA NO.</u>	<u>AMOUNT OF BREEDING</u>	<u>SUGGESTED TREATMENT</u>
5 A	Moderate	Drainage
5 B	"	"
5 C	"	"
5 D	Abundant	Drainage

Sheep Lakes (#6)

Two permanent lakes and seven temporary ponds are included in this area. Mosquito breeding was heavy. Sixty-one gallons of oil were used.

<u>AREA NO.</u>	<u>AMOUNT OF BREEDING</u>	<u>SUGGESTED TREATMENT</u>
6 A	Abundant	Drainage
6 B	Moderate around edges	Oiling
6 C	Abundant	Drainage
6 D	Moderate	"
6 E	"	"
6 F	"	"
6 G	"	"
6 H	"	"
6 I	Abundant	"

DISCUSSION OF BREEDING CONDITIONS BY AREAS (Con)

South Meadows (#7)

There are two permanent lakes and fourteen temporary ponds found here. Mosquitoebreeding was heavy. Some adults had emerged before our oiling operations were begun, but even so, a great deal of good was accomplished by treatment with 247 gallons of oil.

<u>AREA NO.</u>	<u>AMOUNT OF BREEDING</u>	<u>SUGGESTED TREATMENT</u>
7 A	Moderate	Drainage
7 B	Abundant	" or oiling
7 C	"	"
7 D	"	"
7 E	None	None
7 F	Abundant	Drainage
7 G	"	"
7 H	"	"
7 I	Moderate	"
7 J	"	Oiling
7 K	Abundant	"
7 L	Moderate	Drainage
7 M	Abundant	"
7 Ø	"	"
7 P	"	"
7 Q	"	"

DISCUSSION OF BREEDING CONDITIONS BY AREAS (Con)

Surprise Lakes (#8)

Two temporary ponds were caused by a heavy snowfall. Mosquito breeding was extremely abundant in several instances where the normal margins had overflowed. Some adults had emerged before treatment was begun. Twenty gallons of oil were used.

<u>AREA NO.</u>	<u>AMOUNT OF BREEDING</u>	<u>SUGGESTED TREATMENT</u>
8 A	None	None
8 B	"	"
8 C	"	"
8 D	"	"
8 E	Moderate	Oiling
8 F	None	None
8 G	Moderate	Oiling
8 H	"	"
8 I	None	None
8 J	"	"
8 K	"	"
8 L	Moderate	Oiling
8 M	None	None
8 N	Moderate	Oiling
8 O	None	None
8 P	"	"
8 Q	Moderate	Oiling
8 R	None	None
8 S	"	"
8 U	Moderate	Oiling
8 V	Abundant	Drainage
8 W	"	"

DISCUSSION OF BREEDING CONDITIONS BY AREAS (Con)

Sawtooth Mountain (#9)

Eighteen permanent lakes and five temporary ponds are located here. Some bred large numbers of mosquitoes while in some no breeding was seen. Adult mosquitoes escaped before we were able to treat this area. Forty-four gallons of oil were used.

<u>AREA NO.</u>	<u>AMOUNT OF BREEDING</u>	<u>SUGGESTED TREATMENT</u>
9 A	Abundant	Oiling
9 B	Moderate	Drainage
9 C	"	"
9 D	"	"
9 E	Abundant	"
9 F	None	None
9 G	Abundant	Drainage
9 H	None	None
9 I	Moderate	Drainage
9 J	"	"
9 K	None	None
9 L	Moderate	Drainage
9 M	"	"
9 N	"	"
9 O	"	"
9 P	"	"
9 Q	"	"
9 R	"	"
9 S	"	"
9 T	"	"
9 U	"	"
9 V	"	"
9 W	"	"
9 X	"	"
9 Y	"	"
9 Z	"	"
9 Z 1	"	"
9 Z 2	"	"
9 Z 3	"	"
9 Z 4	Abundant	"
9 Z 5	"	"
9 Z 6	"	"

DISCUSSION OF BREEDING CONDITIONS BY AREAS (Con)

East Butte Meadows (#10)

One long meadow and two small meadows are included in this area. Many mosquitoes are produced here and comparatively early. The peak of the production period this season was approximately May 20th. The largest number (130) of adults taken by the writer in a ten minute collection was within this area. Because of our late arrival no oil was used.

<u>AREA NO.</u>	<u>AMOUNT OF BREEDING</u>	<u>SUGGESTED TREATMENT</u>
10 A	Abundant	Drainage and oiling
10 B	Moderate	"
10 C	"	"

Hungry Peak Meadows (#11)

<u>AREA NO.</u>	<u>AMOUNT OF BREEDING</u>	<u>SUGGESTED TREATMENT</u>
11 A	Moderate	Drainage
11 B	"	"

Skookum Meadows (#12)

<u>AREA NO.</u>	<u>AMOUNT OF BREEDING</u>	<u>SUGGESTED TREATMENT</u>
12 A	Moderate	Drainage
12 B	"	"
12 C	"	"
12 D	"	"
12 E	"	"

Surprise Meadows (#13)

<u>AREA NO.</u>	<u>AMOUNT OF BREEDING</u>	<u>SUGGESTED TREATMENT</u>
13	Abundant	Drainage
14	"	"
15	"	"
16	"	"

LIST OF MOSQUITO CONTROL EQUIPMENT ON HAND

4 (four) knapsack spray pumps
8 (eight) cans with brass screw caps
14 (fourteen) feet hose
1 (one) stillson wrench
2 (two) faucets
1 (one) new type nozzle
4 (four) old tupe nozzles
4 (four) hose clamps
2 (two) hose connections
8 (eight) nozzle connections.

OIL ON HAND FOR SEASON 1936-

790 gallons of oil are stored 30 feet north of the Mosquito Lake Guard Station.

RECOMMENDATIONS FOR 1936.

An early inspection should be made, approximately April 1st, depending on the season.

Six oilers are suggested instead of four. *up*

An oil packer.

One cook.

One superintendent.

One truck.

One riding horse for early inspection.

COMMENTS ON MOSQUITO CONTROL BY CARIOUS FOREST SERVICE MEN-1935.

"No comparison; it is a whole lot better than in former years."

Bill Collingwood, Guler, Wash.
Trail man for five years.

"They were a lot worse in former years. We could not fight fire in past years; we had to fight mosquitoes."

C. W. Steward, Box 95, Trout Lake, Wn.
Employed seven years by the Forest Serv.

"Mosquito control, in my opinion, is a great benefit to this country. In my work, that of opening trails, I go through a great many meadows. A person can readily see the difference between meadows which have been oiled and those that have not been."

Toney Guler, Trout Lake, Wash.
Ten years with Forest Service.

" my estimation there are not as many mosquitoes as last year. Mosquito control has done a lot towards opening up this part of the Columbia National Forest."

Edwin E. Howard, Washougal, Wash.
Two years a CCC Foreman.

"Comparing the mosquito situation this year with former years they have been reduced more than fifty percent. Last year, due to a dry season and an early mosquito control program, the mosquitoes were reduced about eighty-five percent. In the years of 1928 and 1929, which were similar to this year, due to late seasons and heavy snowfalls, the mosquitoes made life unbearable. I can safely say that mosquito control is a very necessary project for this part of the Columbia National Forest."

R. A. Culick, Guler, Wash.
Camp. Supt. of CCC Camp #945.
Employed by Forest Service for fifteen years in this district.

"The mosquitoes at Twin Buttes are not nearly so bad as in the other camp ground areas I have been in so far this year. In the un-oiled area around Cultus Creek the mosquitoes are three or four times as bad as around Twin Buttes. People will not camp where there are mosquitoes and this area this year has very few compared to other camp ground areas."

J. P. Langdon,
Junior Forester of the Columbia National
In charge of camp grounds.

SUMMARY

It is considered that effective mosquito control has been accomplished in the Twin Buttes area during 1935, in spite of the fact that the work was started approximately two weeks late.

Approximately 48.5 acres of water surface was treated during the period June 17 - July 30, 1935.

Total costs for the work are:

Diesel Oil, 986 gallons @ 9¢	\$ 88.74
Foreman	277.66
Labor - 5 CCC men, 47 seven-hour days @ \$2.00 each -	<u>450.00</u>
Total cost-	\$ 816.40

Necessary equipment and 790 gallons of oil are stored at the Mosquito Lake Guard Station for control operations during 1936.

Special emphasis should be made in regard to starting the work sufficiently early each year for best results. This date depends entirely upon the first melting snow.



WTB-8-NL Surprise Lakes Area

Along the upper margins of this pond large numbers of mosquitoes are produced in early spring. This picture may be compared with photo WTB-8-N of the 1934 report which shows these margins when dry. The eggs are laid on the dry ground as shown in the 1934 picture but do not hatch until flooded as shown in the above.



WTB-9-G1

Sawtooth Mountain Area

A small mountain meadow in very early spring. The area is a heavy producer of mosquitoes as soon as the ground in the center of the picture is covered with snow water. This photo may be compared with WTB-9-G of the 1934 report which shows the pool of water and with but small banks of snow in the shelter of the trees.



Mosquito eggs hatch with the first melting snow. It is at this time of the year that the first oiling should be done.



Melting of large snow banks floods the upper margins of ponds making it possible for mosquito eggs laid there the previous summer to hatch.